CLAIMS

1. A method of removing ammonia from a gas stream comprising: irradiating the gas stream with UV light; maintaining a NO_x concentration in the gas stream at a concentration level sufficient to maintain in the gas stream an active set of free radical chain reactions; and disassociating hydrogen atoms from ammonia to form NH_2, and reacting NH_2 with NO_x to form N_2 and H_2O.

2. The method of claim 1 wherein NO_x includes NO and NO_2 and wherein the NO_2/NO concentration ratio is maintained generally at a value of less than 10.

3. The method of claim 1 wherein the set of free radical reactions involve NO_x, carbon monoxide, hydrocarbons, water vapor, and ammonia.

4. The method of claim 1 wherein the gas stream includes an initial NO_x concentration upstream from the location where the gas stream is irradiated and a succeeding NO_x concentration at or down stream from the area where the gas stream is irradiated, and wherein the succeeding NO_x concentration is at least 50% of the initial NO_x concentration.

5. The method of claim 4 wherein the set of free radical chain reactions involve NO_x, carbon monoxide, hydrocarbons, water vapor and ammonia.

6. The method of claim 1 including irradiating the ammonia within the gas stream with light in the spectral range of 230 to 370 nanometers.

7. The method of claim 1 including removing particulate matter from the gas stream prior to irradiating the ammonia in the gas stream.

8. The method of claim 1 wherein the intensity of the irradiation falls in the range of 100-2,000 microwatts per square centimeter.

9. The method of claim 1 including filtering particulate matter from the gas stream and providing a two stage irradiation process where one irradiation stage is employed prior to filtering the particulate matter and the second irradiation stage is employed after filtering the particulate matter.

10. The method of claim 1 wherein the disassociated hydrogen atoms form H_2O and hydroperoxy free radicals, and wherein the formed hydroperoxy free radicals continue to initiate oxidation reactions involving ammonia.

11. The method of claim 1 wherein the disassociated atoms form H_2O and hydroperoxy free radicals.

12. A method of producing cement and removing ammonia from a gas stream produced, comprising:

a. directing a raw feed into a pyroprocessing system of a cement manufacturing facility, and heating the raw feed as the raw feed moves through the pyroprocessing system;

b. directing the heated raw feed through at least one kiln that forms a part of the pyroprocessing system to produce cement clinker;

c. heating the pyroprocessing system and directing the resulting gas stream through the pyroprocessing system; and

d. irradiating the gas stream with UV light and disassociating hydrogen atoms from ammonia within the gas stream to form NH_2, and reacting the NH_2 with NO_x to form N_2 and H_2O.

13. The method of claim 12 including irradiating the ammonia within the gas stream with light in the spectral range of 200 to 370 nanometers.

14. The method of claim 12 including removing particulate matter from the gas stream prior to the ammonia in the gas stream being subjected to irradiation.

15. The method of claim 12 wherein the intensity of the irradiation falls in the range of 100-2000 microwatts per square centimeter.

16. The method of claim 12 including filtering particulate matter from the gas stream and providing a two-stage irradiation process where one irradiation stage is employed prior to filtering the particulate matter and the second irradiation stage is employed after filtering the particulate matter.

17. The method of claim 12 wherein the disassociated hydrogen atoms form hydroperoxy free radicals that continue to initiate oxidation reactions involving ammonia.

18. The method of claim 12 wherein the disassociated hydrogen atoms form H_2O and hydroperoxy free radicals and wherein the hydroperoxy free radicals continue to initiate oxidation reactions with ammonia.